

Write your name here

Surname

Other names

Centre Number

Candidate Number

**Edexcel GCSE**

# Methods in Mathematics

## Unit 2: Methods 2

***For Approved Pilot Centres ONLY***

**Higher Tier**

Tuesday 21 June 2011 – Morning

**Time: 1 hour 45 minutes**

Paper Reference

**5MM2H/01**

**You must have:** Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.

Total Marks

### Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided – *there may be more space than you need.*
- **Calculators may be used.**
- If your calculator does not have a  $\pi$  button, take the value of  $\pi$  to be 3.142 unless the question instructs otherwise.



### Information

- The total mark for this paper is 100.
- The marks for **each** question are shown in brackets – *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk** (\*) are ones where the quality of your written communication will be assessed – *you should take particular care on these questions with your spelling, punctuation and grammar, as well as the clarity of expression.*

### Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►

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P 3 8 9 5 8 A 0 1 2 4

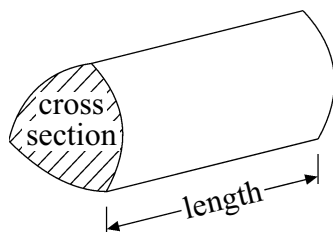
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# GCSE Mathematics 2MM01

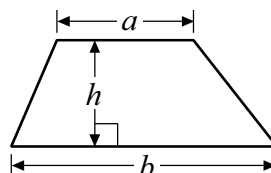
## Formulae – Higher Tier

**You must not write on this formulae page.**  
**Anything you write on this formulae page will gain NO credit.**

**Volume of a prism** = area of cross section  $\times$  length

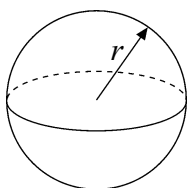


**Area of trapezium** =  $\frac{1}{2}(a + b)h$



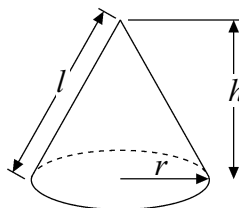
**Volume of sphere** =  $\frac{4}{3}\pi r^3$

**Surface area of sphere** =  $4\pi r^2$

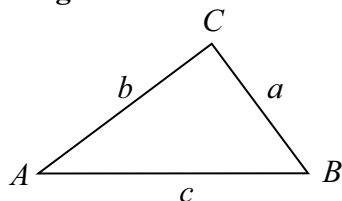


**Volume of cone** =  $\frac{1}{3}\pi r^2 h$

**Curved surface area of cone** =  $\pi r l$



**In any triangle ABC**



**The Quadratic Equation**

The solutions of  $ax^2 + bx + c = 0$

where  $a \neq 0$ , are given by

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

**Sine Rule**  $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

**Cosine Rule**  $a^2 = b^2 + c^2 - 2bc \cos A$

**Area of triangle** =  $\frac{1}{2}ab \sin C$



Answer ALL questions.

Write your answers in the spaces provided.

You must write down all stages in your working.

\*1

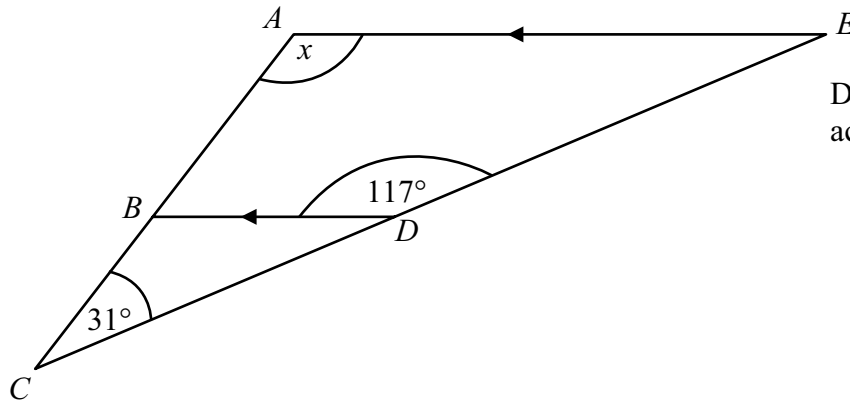


Diagram NOT  
accurately drawn

$AE$  is parallel to  $BD$ .

$ABC$  and  $CDE$  are straight lines.

Work out the size of the angle marked  $x$ .

You must give reasons for your answer.

(Total for Question 1 is 5 marks)



P 3 8 9 5 8 A 0 3 2 4

2 Divide £168 in the ratio 3 : 5 : 4

£..... £..... £.....

(Total for Question 2 is 3 marks)

3 (a) Write  $\frac{17}{80}$  as a decimal.

.....  
(1)

(b) Use your calculator to work out  $\frac{5.6 \times 1.8}{18.03 - 7.4}$

.....  
(2)

(Total for Question 3 is 3 marks)



4 (a) Work out 15% of £600

£ .....  
(2)

(b) Decrease £150 by 12%.

£ .....  
(2)

(c) Work out 28 as a percentage of 35

..... %  
(2)

(Total for Question 4 is 6 marks)



- 5 The diagram shows a solid prism.

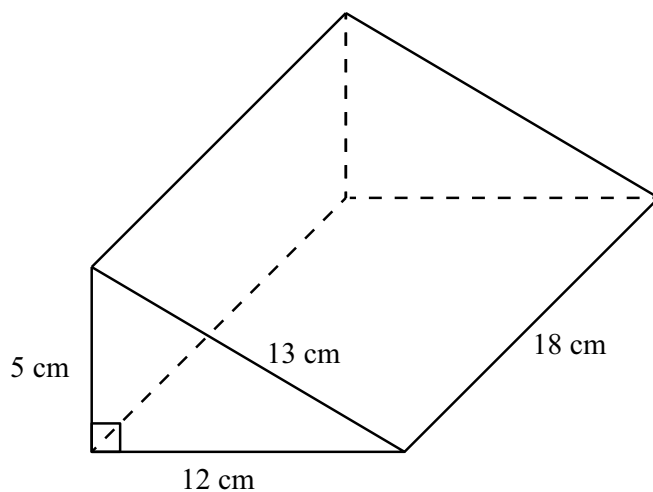


Diagram **NOT**  
accurately drawn

Work out the total surface area of the prism.

..... cm<sup>2</sup>

(Total for Question 5 is 3 marks)



6  $n$  is an integer and  $-2 < n \leq 3$

(a) Write down all the possible values of  $n$ .

.....  
(2)

Here is a number line.



(b) Write down the inequality shown on the number line.

.....  
(2)

**(Total for Question 6 is 4 marks)**

7 The formula for the circumference of a circle is  $C = \pi d$ .

Work out the circumference of a circle of radius 4.7 cm.

Give your answer correct to 1 decimal place.

..... cm

**(Total for Question 7 is 3 marks)**



- 8 The diagram shows 3 sides of a regular polygon.

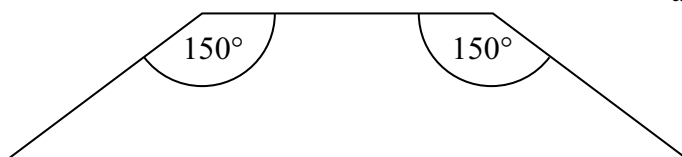


Diagram **NOT**  
accurately drawn

Each interior angle of the regular polygon is  $150^\circ$ .

Work out the number of sides of the regular polygon.

.....  
(Total for Question 8 is 3 marks)

- 9 The width of a rectangle is a whole number of centimetres.  
The length of the rectangle is 9 cm longer than its width.

The perimeter of the rectangle is less than 200 cm.

Find the greatest possible width of the rectangle.

..... cm

(Total for Question 9 is 4 marks)





10

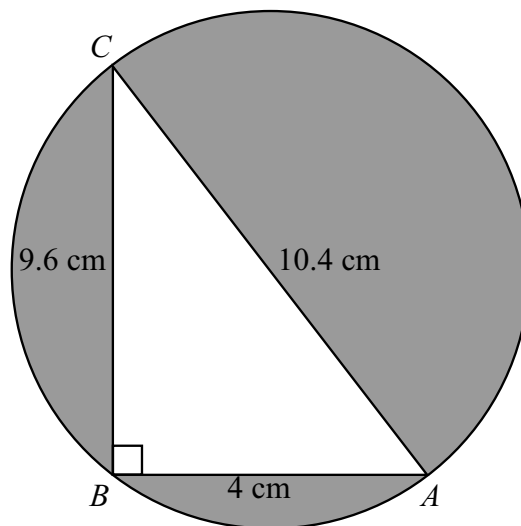


Diagram **NOT**  
accurately drawn

$AC$  is a diameter of the circle.  
 $ABC$  is a right-angled triangle.

Work out the shaded area.  
Give your answer correct to 1 decimal place.

.....  $\text{cm}^2$

(Total for Question 10 is 5 marks)



P 3 8 9 5 8 A 0 9 2 4

11 (a) Complete the table for  $y = x^2 + 2x - 4$

$x$	-4	-3	-2	-1	0	1	2
$y$		-1	-4				4

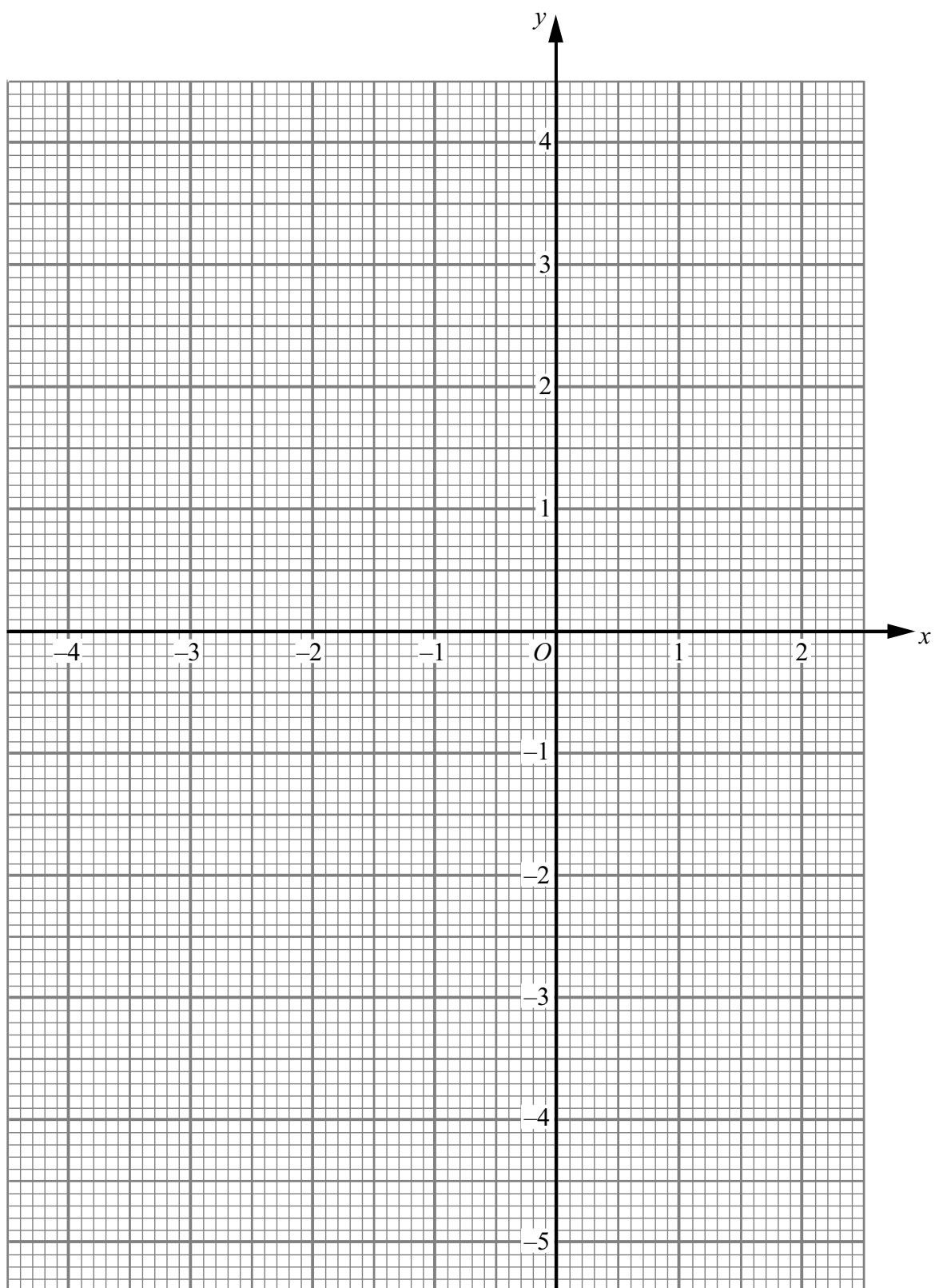
(b) On the grid opposite, draw the graph of  $y = x^2 + 2x - 4$  (2)

(c) Use the graph to find estimates of the solutions of the equation

$$x^2 + 2x - 4 = 0$$

..... (2)





(Total for Question 11 is 6 marks)



12

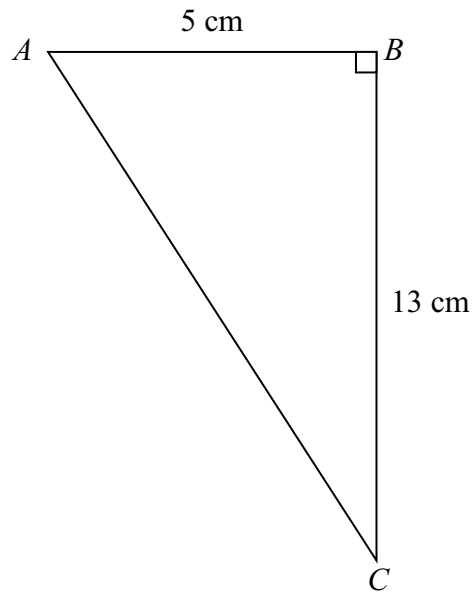


Diagram **NOT**  
accurately drawn

$ABC$  is a right-angled triangle.

$AB = 5$  cm.

$BC = 13$  cm.

Work out the length of  $AC$ .

Give your answer correct to 3 significant figures.

..... cm

(Total for Question 12 is 3 marks)



13

$$c^2 = \frac{2 \times 7 \times 10^6 + 9 \times 10^7}{7 \times 10^6 \times 9 \times 10^7}$$

Work out the value of  $c$ .

Give your answer in standard form correct to 2 significant figures.

.....  
(Total for Question 13 is 3 marks)

- 14 When a number is increased by 15% the answer is 253  
What is the number?

.....  
(Total for Question 14 is 3 marks)



15 The diagram shows a quadrilateral  $ABCD$ .

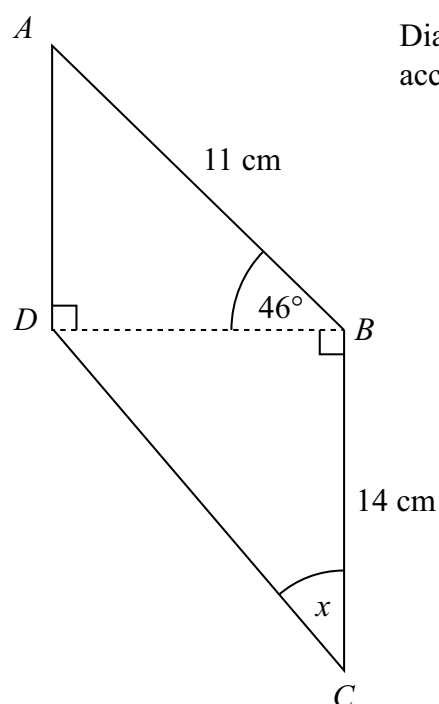


Diagram **NOT**  
accurately drawn

Angle  $ADB = \text{Angle } DBC = 90^\circ$ .

$AB = 11\text{ cm}$ .

$BC = 14\text{ cm}$ .

Angle  $ABD = 46^\circ$ .

Work out the size of the angle marked  $x$ .

(Total for Question 15 is 6 marks)



- 16** Solve the simultaneous equations.  
You must show all your working.

$$3x + 8y = 6$$

$$5x - 2y = 33$$

$$x = \dots\dots\dots$$

$$y = \dots\dots\dots$$

---

**(Total for Question 16 is 4 marks)**

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17  $m = kp^2$

Given that  $m = 16$  when  $p = 5$

(a) work out the value of  $k$ .

.....  
(2)

(b) Work out the value of  $p$  when  $m = 36$

.....  
(2)

---

(Total for Question 17 is 4 marks)

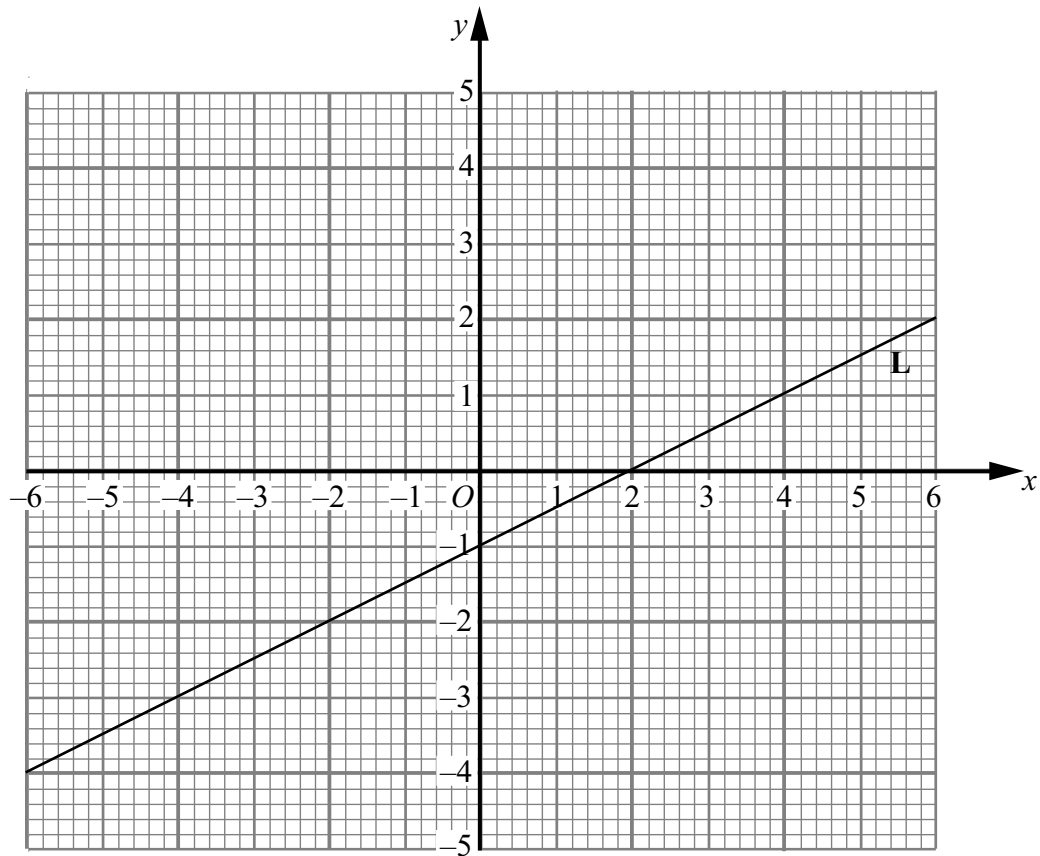
18 Solve  $3x^2 - 5x - 1 = 0$

Give your solutions correct to 3 significant figures.

.....  
(Total for Question 18 is 3 marks)







The straight line **L** has equation  $y = \frac{1}{2}x - 1$

(a) Write down an equation of a line parallel to **L**.

.....  
(1)

(b) Find an equation of the line that goes through the point (4, 1) and is perpendicular to **L**.

.....  
(3)

(Total for Question 19 is 4 marks)



**20** Make  $a$  the subject of the formula  $2(a - m) = 7 - a$

$a =$  .....

**(Total for Question 20 is 3 marks)**

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21 The diagram shows a solid shape.

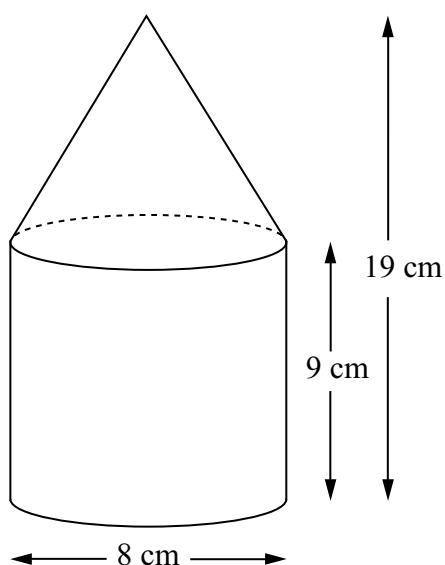


Diagram **NOT**  
accurately drawn

The shape is a cone on top of a cylinder.

The shape has a total height of 19 cm.

The base of the cone has a diameter of 8 cm.

The cylinder has a diameter of 8 cm and height 9 cm.

Work out the volume of the shape.

Give your answer correct to 3 significant figures.

..... cm<sup>3</sup>

(Total for Question 21 is 4 marks)



22 The diagram shows a sector of a circle of radius 6.8 cm.

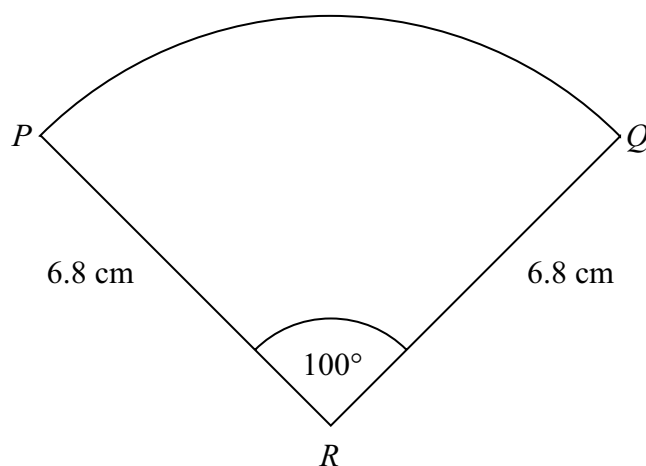


Diagram **NOT**  
accurately drawn

$PQ$  is an arc of the sector.  
Angle  $PRQ = 100^\circ$ .

Work out the perimeter of the sector.  
Give your answer correct to 3 significant figures.

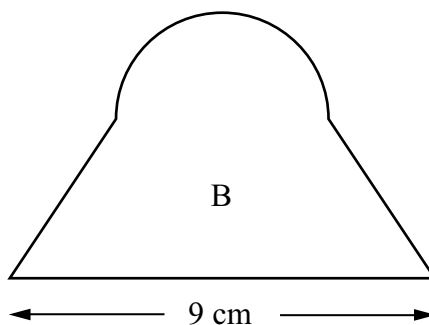
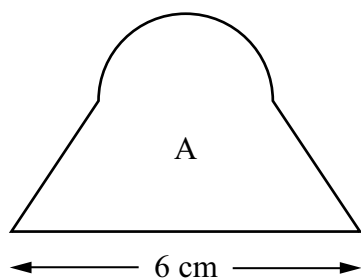
..... cm

(Total for Question 22 is 3 marks)



23 The diagram shows two similar solid shapes, A and B.

Diagram **NOT**  
accurately drawn



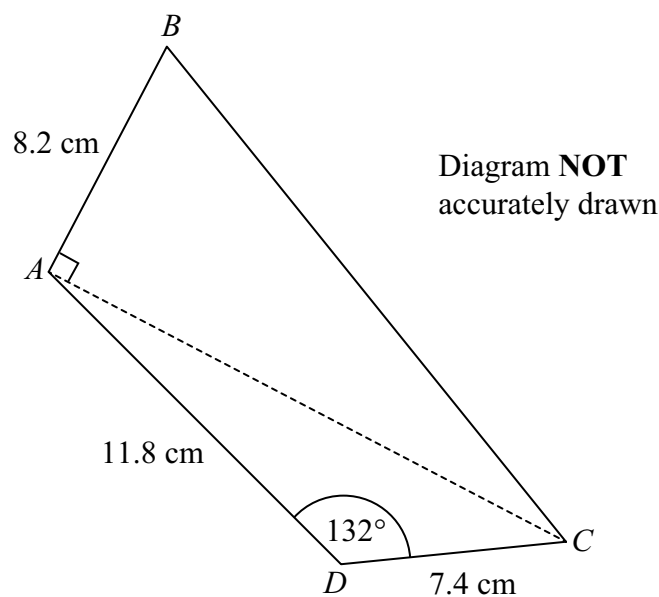
The total surface area of A is  $103 \text{ cm}^2$ .

Work out the total surface area of B.

.....  $\text{cm}^2$

(Total for Question 23 is 3 marks)



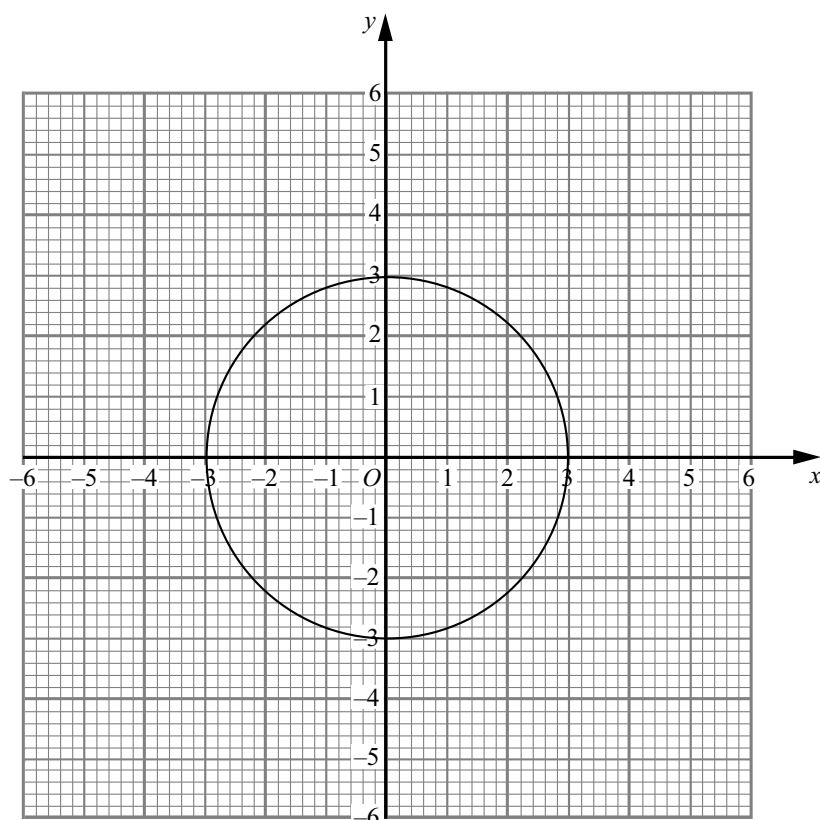


Work out the area of the quadrilateral  $ABCD$ .  
Give your answer correct to 3 significant figures.

.....  $\text{cm}^2$

(Total for Question 24 is 6 marks)





(a) Write down the equation of the circle.

.....  
(1)

(b) Solve the equations  $x^2 + y^2 = 25$   
 $y - 2x = 5$

.....  
(5)

(Total for Question 25 is 6 marks)

TOTAL FOR PAPER IS 100 MARKS



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